Topic: Finding the equation of a function from points

Question: Use the given functions to find $f(x)$.

$$f^{-1}(4) = 1$$

$$f^{-1}(-2) = -2$$

Answer choices:

A $f(x) = 2x + 6$

B $f(x) = 2x - 2$

C $f(x) = 2x - 6$

D $f(x) = 2x + 2$

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Solution: D

Use the points $(4,1)$ and $(-2,-2)$ to find the slope of $f^{-1}(x)$.

$$m = \frac{-2-1}{-2-4} = \frac{-3}{-6} = \frac{1}{2}$$

Use one of the two points and $y - y_1 = m(x - x_1)$ to find the equation of $f^{-1}(x)$.

We'll use $(4,1)$ and solve for x.

$$y - 1 = \frac{1}{2}(x - 4)$$

$$y - 1 = \frac{1}{2}x - 2$$

$$y + 1 = \frac{1}{2}x$$

$$x = 2y + 2$$

Swap x and y to get the inverse function.

$$y = 2x + 2$$

$$f(x) = 2x + 2$$

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Topic: Finding the equation of a function from points

Question: Use the given functions to find $f(x)$.

$$f^{-1}(2) = 5$$

$$f^{-1}(1) = -1$$

Answer choices:

A $f(x) = \frac{1}{6}x + \frac{7}{6}$

B $f(x) = \frac{1}{4}x + \frac{3}{4}$

C $f(x) = \frac{1}{6}x - \frac{7}{6}$

D $f(x) = \frac{1}{4}x - \frac{3}{4}$

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Solution: A

Use the points $(2,5)$ and $(1,-1)$ to find the slope of $f^{-1}(x)$.

$$m = \frac{5-(-1)}{2-1} = 6$$

Use one of the two points and $y - y_1 = m(x - x_1)$ to find the equation of $f^{-1}(x)$.

We'll use $(2,5)$ and solve for x.

$$y - 5 = 6(x - 2)$$

$$y - 5 = 6x - 12$$

$$y + 7 = 6x$$

$$x = \frac{1}{6}y + \frac{7}{6}$$

Swap x and y to get the inverse function.

$$y = \frac{1}{6}x + \frac{7}{6}$$

$$f(x) = \frac{1}{6}x + \frac{7}{6}$$

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